

REMARKS

Status Summary

Claims 1-30 and 32-62 are pending in the present application and have been examined by the U.S. Patent and Trademark Office (hereinafter "the Patent Office"). Claims 1-30 and 32-62 presently stand rejected.

Claims 1-30 and 32-62 have been provisionally rejected on the ground of nonstatutory obviousness-type double patenting upon the contention that the claims are unpatentable over claims in U.S. Patent Application No. 09/996,695.

Additionally, claims 1-30 and 32-62 stand rejected under 35 U.S.C. § 103(a) upon the contention that the claims are unpatentable over published European Patent Application EP 989,579 to Bower *et al.* (hereinafter "Bower '579") in view of U.S. Patent No. 6,616,497 to Choi *et al.* (hereinafter "Choi '497").

By this Amendment, claims 1, 33, 34 and 38 have been amended and claim 32 has been cancelled. No new matter has been added. Therefore, upon entry of the Amendment, claims 1-30 and 33-62 will be pending in the subject application.

Response to the Obviousness Type Double Patenting Rejection

Claims 1-30 and 32-62 have been provisionally rejected on the ground of nonstatutory obviousness-type double patenting upon the contention that the claims are unpatentable over claims in U.S. Patent Application No. 09/996,695. The Examiner contends that although the conflicting claims are not identical, they are not

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patentably distinct from each other because the claims of the instant application are "fully encompassed" by the claims of the parent application. The Examiner also notes that a non-statutory obviousness-type double patenting rejection can be overcome by filing a terminal disclaimer in compliance with 37 C.F.R. 1.321(c).

Initially, applicants respectfully submit that claim 1 has been amended herein to recite masking at least a portion of at least one surface of the substrate by depositing of a layer of photoresist on the surface of the substrate and forming a pattern of openings therein by UV photolithography. Support for the amendment can be found in the specification as filed. See, for example, pages 17-19. Support for the amendment can also be found in cancelled claim 32.

Applicants respectfully submit that the claims of the instant application are not fully encompassed by the claims of the parent application. Specifically, independent claims 1, 40 and 46 recite depositing a layer of photoresist on the substrate. Applicants respectfully submit that nowhere is the element of depositing photoresist claimed in U.S. Patent Application No. 09/996,695. Therefore, the claims of the instant application are not encompassed by the claims of the parent application as asserted by the Examiner.

Accordingly, applicants respectfully request that the provisional nonstatutory obviousness-type double patenting rejection of claims 1-30 and 33-62 be withdrawn, and request claims 1-30 and 33-62 be allowed at this time.

Response to the Rejection of Claims Under 35 U.S.C. § 103(a)

Claims 1-30 and 32-62 stand rejected under 35 U.S.C. § 103(a) upon the contention that the claims are unpatentable over Bower '579 in view of Choi '497. The Examiner asserts that Bower '579 discloses the claimed method of electrophoretic deposition, but does not teach the use of a mask as claimed. However, the Examiner contends that Choi '497 teaches the use of a mask for patterned electrophoretic deposition and discloses the use of resists to form the mask. Therefore, the Examiner asserts that it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Bower '579 with the teachings of Choi '497.

The positions of the Examiner as summarized above with respect to the rejected claims are respectfully traversed as described below.

Initially, applicants respectfully submit that claim 1, step (ii), has been amended herein to recite masking at least a portion of at least one surface of the substrate by depositing a layer of photoresist on the surface of the substrate and forming a pattern of openings therein by UV photolithography. Support for the amendment can be found in the specification as filed. See, for example, pages 17-19. Support for the amendment can also be found in cancelled claim 32.

Applicants respectfully submit that neither Bower '579 nor Choi '497, nor the proposed combination thereof, teach or suggest each and every element of independent claims 1, 40 and 46. Particularly, applicants respectfully submit that Choi '497 does not teach using a photoresist layer as a mask to deposit a pattern of

nanostructure-containing material as presently claimed. Specifically, claim 1 recites masking at least a portion of at least one surface of the substrate by depositing of a layer of photoresist on the surface of the substrate and forming a pattern of openings therein by UV photolithography. Claim 40 recites depositing a layer of insoluble photoresist on the surface of the substrate. Claim 46 recites depositing a release layer on the surface of the substrate and depositing a layer of photoresist on the release layer. In each of claims 1, 40 and 46, the photoresist itself acts as the mask which effectively allows for the patterned deposition of nanostructure-containing material. Therefore, because the patterned photoresist acts as the mask it cannot be removed until after the deposition of the nanostructure-containing material, as stated in claims 34, 40 and 46.

Choi '497 briefly summarizes a method of manufacturing a conventional field emitter as disclosed in the prior art, wherein a photoresist mask is used to form gates in a gate layer. After removing the photoresist mask, the gate layer is used as an etching mask to etch a hole in a dielectric film which exposes an electrode upon which an electron emitter is deposited. See the '497 application, column 1, lines 39-55.

Accordingly, as stated by the Examiner on page 4 of the Office Action, the photoresist of Choi '497 is used to form the mask. In marked contrast, the presently claimed subject matter uses the patterned photoresist itself as the mask for the patterned deposition of nanostructure-containing materials. This difference between the use of the photoresist in the instant application and Choi '497 is substantiated by

the fact that the photoresist of Choi '497 is removed prior to the deposition of nanostructure-containing material, whereas the photoresist mask is not removed until after electrophoretic deposition of nanostructure-containing materials in the presently claimed subject matter.

Of note, the use of the photoresist as the mask for the patterned electrophoretic deposition of nanostructure-containing material is advantageous in that the nanostructure-containing material is deposited only on the exposed substrate surfaces and not on the photoresist. See page 20, Example 1, of the instant patent application. Alternatively, the method disclosed by Choi '497, wherein a photoresist layer is used to form a gate layer which is subsequently used as an etching mask, results in a by-product layer being deposited on the mask which must be removed after the formation of the emitter tip. See column 1, lines 49-55, and Figure 6 of Choi '497.

Accordingly, applicants respectfully submit that Bower '579 and Choi '497, either alone or in combination, do not teach or disclose each and every element of claims 1, 40 and 46. Therefore, applicants respectfully request that the rejection of claims 1, 40 and 46 under 35 U.S.C. § 103(a) over Bower '579 and Choi '497 be withdrawn and also request that claims 1, 40 and 46 be allowed at this time.

As each of claims 2-30 and 33-62 depend from claims 1, 40 and 46, these dependent claims each share the novel features of claims 1, 40 and 46. Thus, applicants submit that claims 2-30 and 33-62 are patentable over the combination of Bower '579 and Choi '497. Thus, applicants respectfully request that the rejection of

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claims 2-30 and 33-62 under 35 U.S.C. § 103(a) over Bower '579 and Choi '497 be withdrawn, and request that claims 2-30 and 33-62 be allowed at this time.

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CONCLUSION

In light of and upon entry of the above amendments and remarks, it is respectfully submitted that the present application is now in proper condition for allowance, and an early notice to such effect is earnestly solicited.

If any small matter should remain outstanding after the Patent Examiner has had an opportunity to review the above Remarks, the Patent Examiner is respectfully requested to telephone the undersigned patent attorney in order to resolve these matters and avoid the issuance of another Official Action.

FEE DUE

A check in the amount of \$120.00 is enclosed for the fee due. The Commissioner is authorized to charge any deficiencies of payment associated with the filing of this correspondence to Deposit Account No. 50-0426 to avoid the unintentional abandonment of the instant application.

Respectfully submitted,

JENKINS, WILSON, TAYLOR & HUNT, P.A.

Date: June 5, 2007

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421/170/8/2 CIP